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Engelke

[11] **4,417,512**

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[54] **CAN CRUSHER**

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[51] **Int. Cl.**[3] **B30B 9/32**

[52] **U.S. Cl.** **100/266;** 100/295; 100/902

[58] **Field of Search** 100/902, 295, 266, 240, 100/245, 268, 231; 99/578

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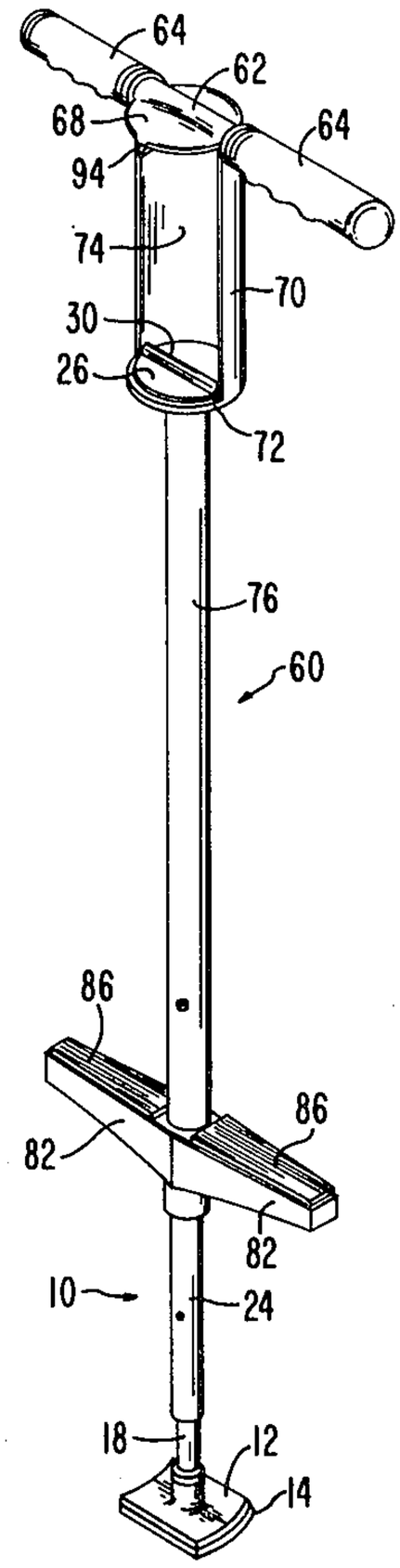
Primary Examiner—Billy J. Wilhite

[57] **ABSTRACT**

An improved can crushing device designed to crush cans such as aluminum beverage containers for recycling purposes comprises a vertically reciprocating plunger **60,** the faceplate **68** of which acts in conjunction with an elevated can platform **26,** mounted on a primary column **10** to exert force at the top and bottom of the can **100** to effectuate the crushing process. A handlebar **62** attached at the top and a footbar **82** attached at the bottom of the plunger assembly **60** provides a means for the operator simultaneously to apply force from arm and leg muscles and body weight to crush the can. A suppressor **16** is built into the primary column to permit the operator to gain and maximize the use of momentum at the first and at the final stages of the crushing process and to absorb the abrupt reduction of downward movement at the last stage of the crushing process. A return spring **28** holds the device at its fully extended height except during the crushing process. The device also has anti-slip hand grips **64,** and foot pads **86,** and a resilient base surface **14** to maximize safety during its operation.

11 Claims, 10 Drawing Figures



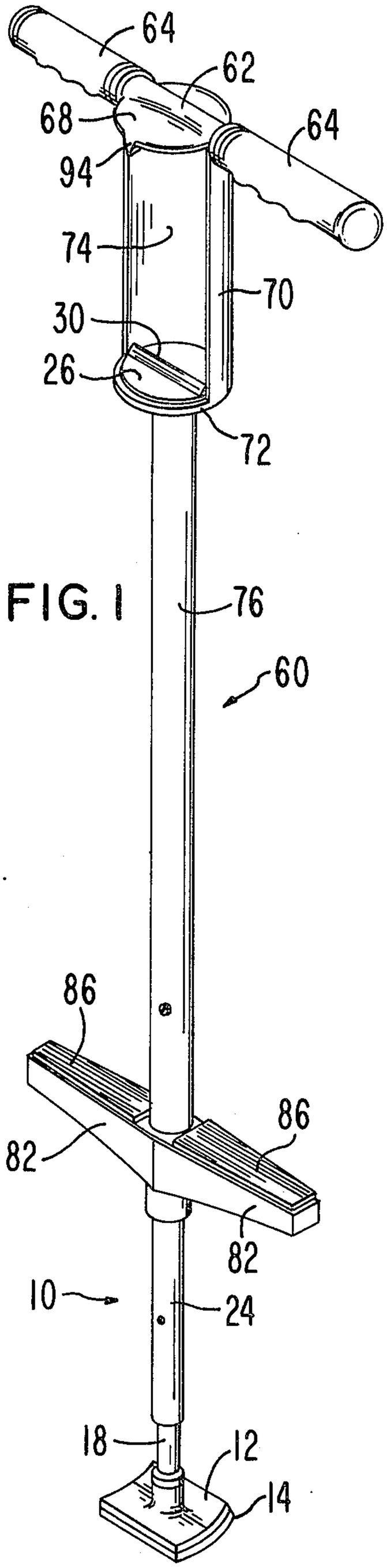

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FIG. 1

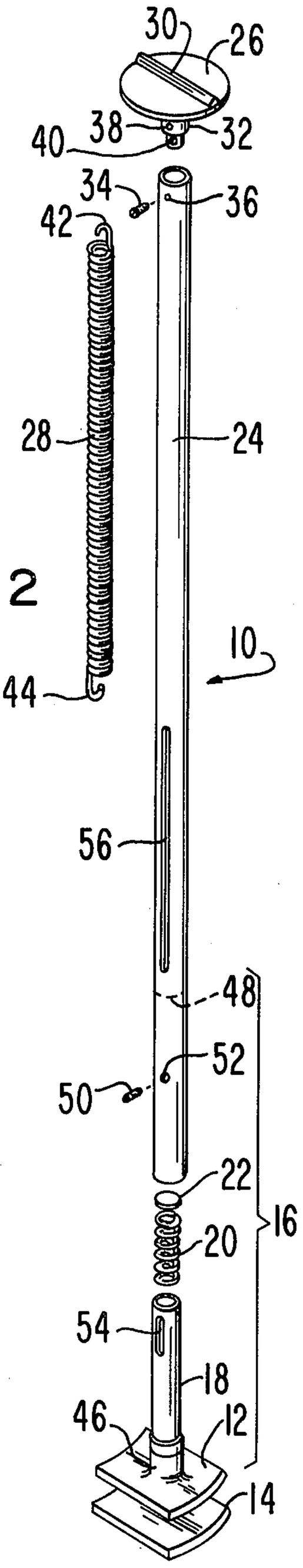
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FIG. 2

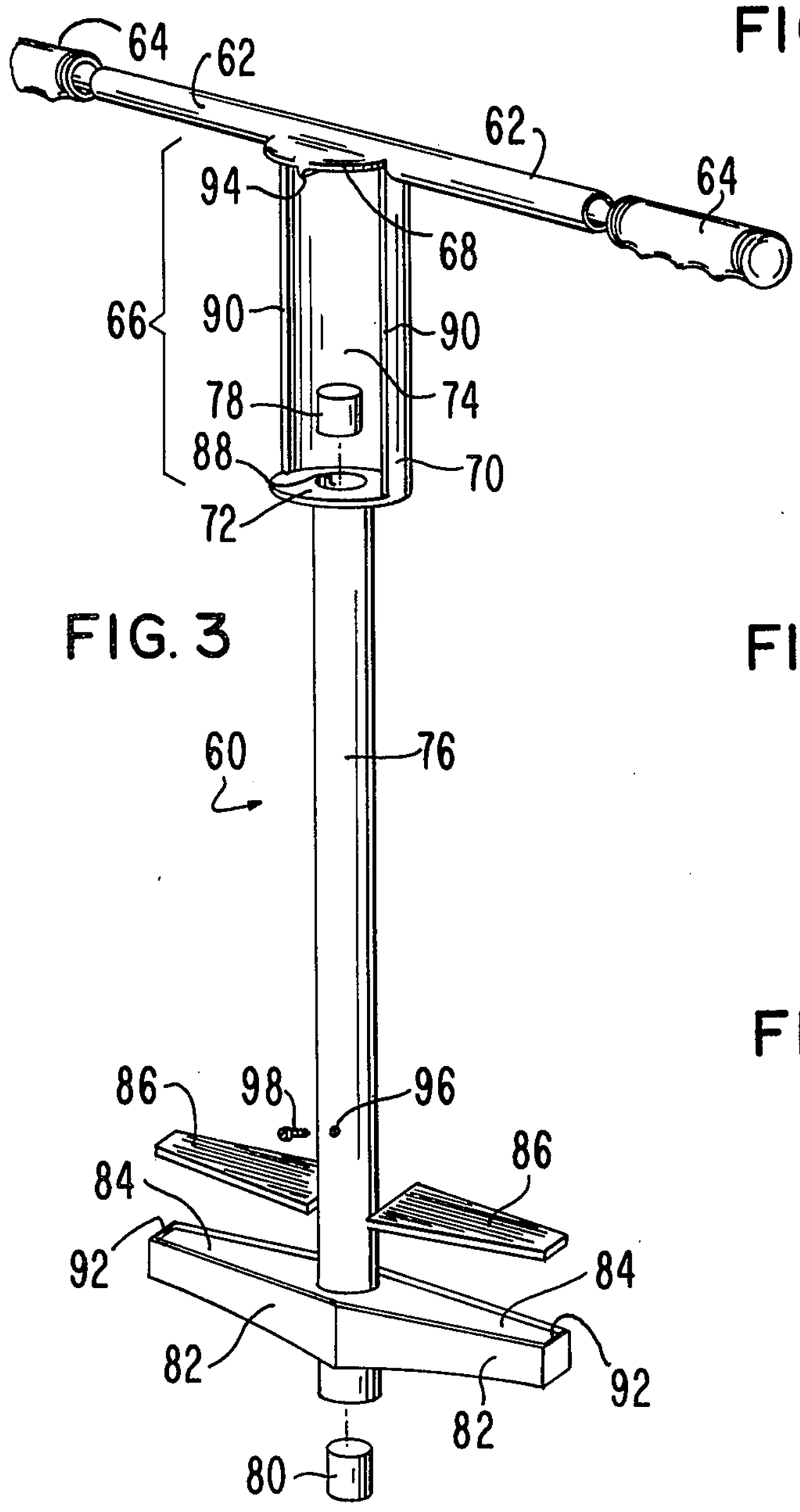

FIG. 3

FIG. 4A

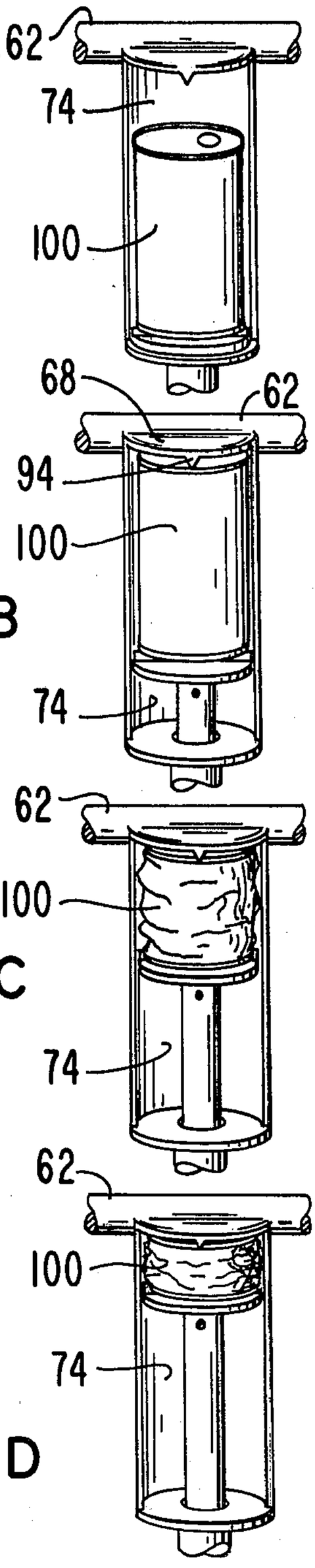

FIG. 4B

FIG. 4C

FIG. 4D

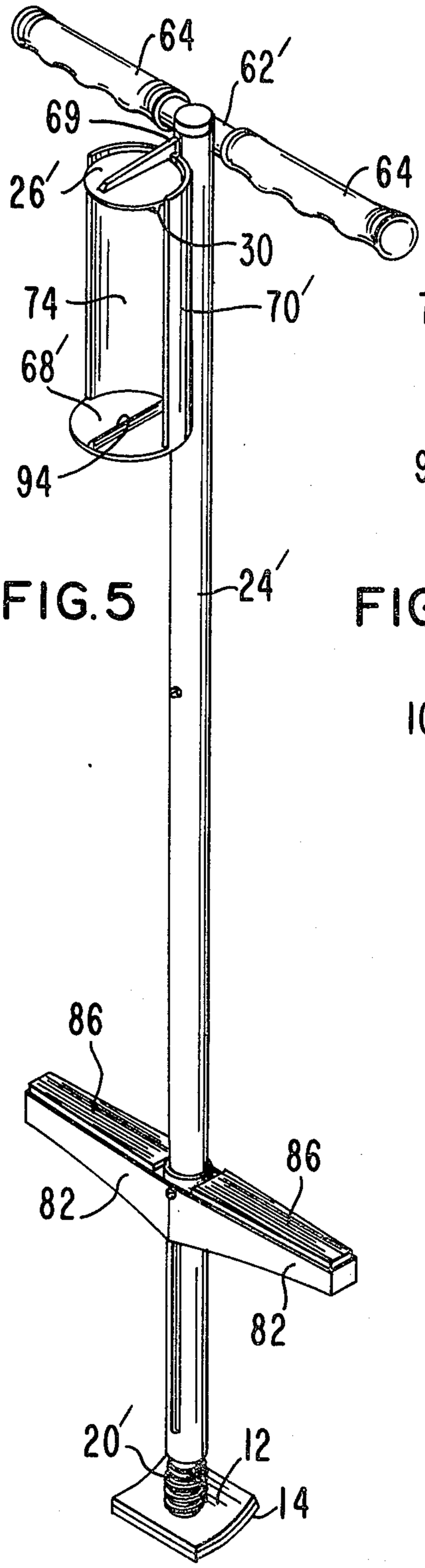

FIG. 5

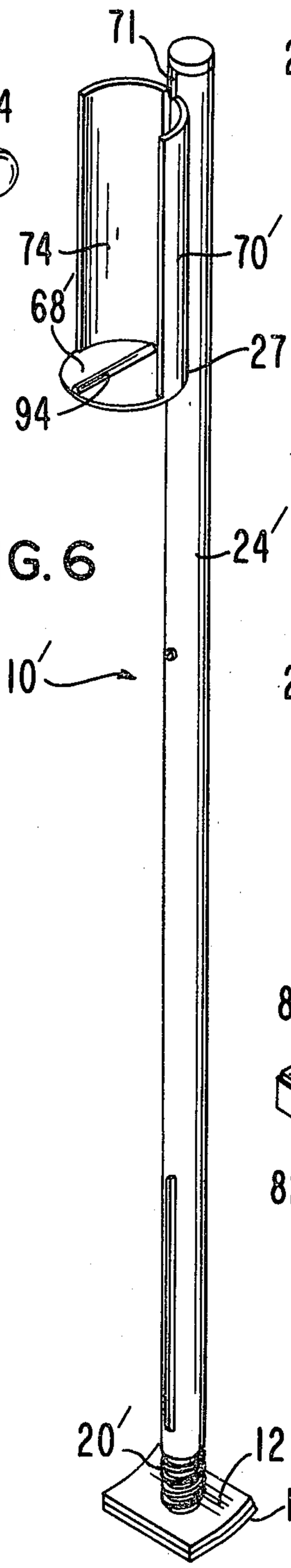

FIG. 6

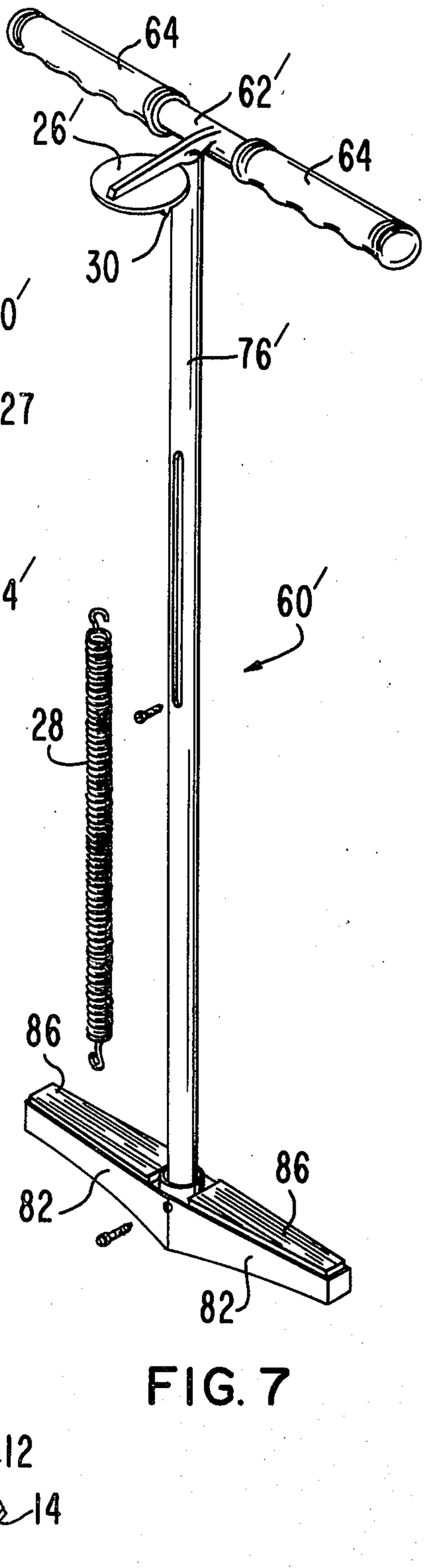

FIG. 7

CAN CRUSHER

BACKGROUND

1. Field of Invention

This invention relates to crushing and compacting devices. More specifically, this invention relates to the crushing and compacting of used cans such as aluminum beverage containers to conserve storage space and to simplify their handling and transportation.

The practice of salvaging aluminum cans because of their cash value has become commonplace by individuals, households, businesses, civic, and charitable groups. This practice has been given impetus because of increased use of disposable aluminum cans, particularly by the beverage industry. The establishment of numerous aluminum recycling centers by industry has further encouraged the collection of aluminum cans. The above developments have made it economically attractive for individuals, households, and others to salvage aluminum cans as a supplemental source of income.

2. Description of Prior Art

Uncrushed cans in large numbers require an inordinate amount of storage space relative to space usually available to the average collector and relative to their resale value. As a result, to conserve space collectors have resorted to crushing cans using a variety of methods, including the use of feet or hands, or using a hammer or other heavy objects.

Prior art can crushing devices have not attained wide acceptance in the marketplace. This is believed due to the fact that most such devices have relatively cumbersome and complex mechanisms which often require attachment to other objects to be operable. Most lack ready portability and one such device lacks means to flatten cans uniformly, particularly if rigidity of the supporting surface varies as the operator moves from can to can.

OBJECTS OF THE INVENTION

Accordingly several objects of the invention are to provide a device which will crush cans of various heights and diameters without the need for manual adjustment and which is designed to enable inserting, crushing, and removing the can in a single synchronized operation at a height which enables the operator to expeditiously apply force to crush the can.

The device is designed to be portable for operation on any firm surface such as parksites, sidewalks, roadsides, or kitchen floors without damage to the supporting surface, but has alternate means for stationary installation. The device also has anti-slip hand grips and foot pads and a resilient base surface to maximize safety during its operation.

Additional objects of this invention are to provide a can crushing device which is simple to use and which can be operated by persons in a variety of age groups including youths and seniors; which has a minimum of moving parts and which will require minimal maintenance and repair; which is streamlined, distinctive and pleasing in appearance, and which has no nonfunctional parts or appendages; which has a controlled crushing aperture to preclude injury to the operator or bystanders; which because of its cost, operation and general appeal will encourage the increasing trend toward recycling of aluminum cans; which will be in a cost range that makes it reasonably available to persons of all income groups and which can produce income on a profit-making basis; which can be flexibly attached to a floor, wall, or other stable object or to a base of sufficient size and weight to support the device if a permanent installation is preferred by the operator; which will quickly, efficiently and uniformly crush cans including partially-damaged or mutilated cans to approximately one-fourth of original volume and into a shape which facilitates handling, storage and transportation for disposal or reclamation purposes; which when not in use can be stored or placed at rest in any convenient upright or horizontal position such as in a broom closet, kitchen, service porch, garage, or trunk of an automobile; which can be economically constructed from lightweight plastic or metal or a combination of plastic, metal or other durable, lightweight material; which lends itself to economical mass production using extrusion, fabrication, prefabrication, or a combination of manufacturing methods; which, because of its portability, precision and convenience of operation, design and cost, will obviate the disadvantages of prior art devices. The specific nature of the invention as well as other objects, uses and advantages thereof, will appear clearly from the following description and from the accompanying drawings, the different views of which are not necessarily to the same scale.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front perspective view of the preferred embodiment of the can crusher.

FIG. **2** is an exploded view of the primary column assembly of the preferred embodiment.

FIG. **3** is an exploded view of the plunger of the preferred embodiment.

FIGS. **4A**, **4B**, **4C** and **4D** are partial front views of the can crusher depicting four stages, A through D, of the crushing process.

FIG. **5** is a front perspective view of an alternate embodiment of the can crusher.

FIG. **6** is a view of the primary column of the alternate embodiment.

FIG. **7** is a view of the plunger assembly of the alternate embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows a fully-assembled can crushing device, which is comprised of a primary column **10** and a vertically reciprocative plunger **60**. The overall height of a presently-preferred embodiment of the assembled can crusher is approximately 91 cm. (36 inches). Because of its telescopic action, the height is reduced to approximately 76 cm. (30 inches) at the end of the can crushing process. The can crusher returns to its full height at completion of the can crushing cycle. The can crushing device may be constructed of metal or plastic, or a combination of metal or plastic or other suitable material by means of extrusion, casting, molding, prefabrication, or a combination of manufacturing methods.

FIG. **2** shows an exploded view of primary column **10** consisting of a vertically-disposed primary column shaft **24**; a return spring **28**; a base **12**, and a base anti-slip pad **14**; a spring loaded suppressor unit **16** comprised of a suppressor stem **18**, a suppressor spring **20**, and a spring barrier disk **22**; and a horizontally disposed can piston **26**. The vertically-disposed primary column shaft **24** is of hollow tubular construction with an outside diameter of approximately 2.5 cm. (1 inch) and a length

of approximately 66 cm. (26 inches) and having a longitudinal slot **56** which extends downward approximately 18 cm. (7 inches) from a point approximately 35.5 cm. (14 inches) from the top of the shaft. Threaded hole **52** is located upward approximately 7 cm. (2.75 inches) from the bottom of the shaft and countersunk hole **36** is located downward approximately 1.3 cm. ($\frac{1}{2}$ inch) from the top of the shaft. Both holes and the slot are in alignment along one longitudinal side of the shaft. Spring barrier disc **22** is permanently installed in a flat horizontal position within the shaft at location **48**. Return spring **28** is a pull-type spring with hooks **42** and **44** on opposite ends, with a contracted static length of approximately 33 cm. (13 inches) and with a resiliency capability for repeated expansion to approximately 53 cm. (21 inches) and contraction to its static length. The return spring has an outside diameter of suitable size to permit a slidable fit within primary column shaft **24**.

Base **12** is rectangular with its top face attached removably and horizontally to the lowermost end of suppressor stem **18** at centralized location **46**. The lower face of base **12** is convex along the longitudinal side opposite from the entry side of slot **54** in suppressor stem **18**. The lower face of base anti-slip pad **14** follows the same rectangular and longitudinal convex shape as base **12** and its upper concave surface is attached to the lower convex face of base **12**.

In relation to the construction of the spring loaded suppressor unit **16**, the suppressor stem **18** is approximately 11 cm. (4.5 inches) in length and has an outside diameter slightly smaller than the inside diameter of primary column shaft **24**, permitting the top end of the suppressor stem to be slidably mounted within the lowermost end of primary column shaft **24**. The bottom end of suppressor stem **18** is fastened to the top surface of base **12** at a centralized location as indicated by **46**. Slot **54** in the suppressor stem is approximately 3 cm. (1.25 inches) in length and penetrates the full diameter of the suppressor stem, going downward from a point approximately 1.3 cm. ($\frac{1}{2}$ inch) from the top of the stem, with the entry side of the slot representing the front of the stem. The line formed by the slot from the front to the back of the stem is positioned at a right angle to the longitudinal sides of base **12**.

The suppressor unit **16** is assembled by inserting the spring barrier disc **22** upwardly into the primary column shaft **24** to a point indicated by dashed line **48**, where it is permanently fastened, as by welding, in a flat horizontal position. Suppressor spring **20** is then upwardly inserted into primary column shaft **24** until it is in contact with the lower surface of the spring barrier disc **22**. Next, the top of the suppressor stem **18** is upwardly inserted into primary column shaft **24** until it is in contact with the bottom of suppressor spring **20** compressing it sufficiently to permit installation of setscrew **50** into threaded hole **52** of primary column shaft **24**, and into slot **54** of suppressor stem **18**.

Can piston **26** is a flat disc approximately 7.5 cm. (3 inches) in diameter. The base of triangular crimping bar **30**, approximately 7.5 cm. (3 inches) in length and 0.8 cm. (5/16 inch) in height, is permanently fastened in a bisecting position, with the center of the base approximately 0.3 cm. ($\frac{1}{8}$ inch) forward from the circumferential center of the piston and with one longitudinal edge facing upward, to the upper side of can piston **26**. A tubular extension **32**, approximately 3.8 cm. (1.5 inches) in length, is permanently attached in a concentric position to the lower side of can piston **26**. The outside diameter of tubular extension **32** is slightly less than the inside diameter of primary column shaft **24** to allow its insertion into the shaft during assembly of the device. A threaded hole **38** is located on one side of the tubular extension, to coincide with countersunk hole **36** in primary column shaft **24**, and facing at a right angle in relation to the longitudinal direction of crimping bar **30**. A loop **40** is permanently attached to the lowermost end of tubular extension **32**.

FIG. **3** shows an exploded view of the vertically reciprocative plunger **60**, which consists of a footbar **82** and antislip foot pads **86**; an interconnector shaft **76** and two bushings **78** and **80**; a can receptacle unit **66** consisting of plunger face plate **68**, a receptacle wall **70**, and a receptacle floor **72**; a handlebar **62**, and handlebar antislip grips **64**.

In relation to the construction of the footbar unit, the foot bar **82** is approximately 25 cm. (10 inches) in length and is horizontally attached to interconnector shaft **76** with the lowermost edge of footbar **82** approximately 5 cm. (2 inches) from the extreme lower end of interconnector shaft **76**. Footbar **82** extends at right angles an equal distance and height from opposite sides of interconnector shaft **76**. The top surface of footbar **82** is recessed as indicated by **84**. During assembly, antislip foot pads **86**, each approximately 11 cm. (4.25 inches) in length, are permanently installed in recesses **84**.

The hollow interconnector shaft **76** is approximately 50 cm. (20 inches) in length and has an outside diameter of approximately 3 cm. (1.25 inches). Interconnector shaft **76** extends upwardly from a point approximately 5 cm. (2 inches) below the lowermost edge of footbar **82**, and at right angles through the longitudinal and latitudinal center of footbar **82**, continuing upward to the bottom surface of receptacle floor **72** at which point it is concentrically attached. Bushing **80**, with an inside diameter of suitable size to provide a slidable fit for primary column shaft **24** of FIG. **2**, is press-fit upwardly into the bottom end of interconnector shaft **76**, with its lower edge flush with the lower edge of interconnector shaft **76**. Bushing **78**, with the same inside diameter as bushing **80**, is press-fit downwardly into the top end of interconnector shaft **76**, with its top edge flush with the top edge of interconnector shaft **76**.

In relation to the construction of the can receptacle unit **66**, the receptacle floor **72** is a flat washer-type disc approximately 8 cm. (3.25 inches) in diameter having a centrally located hole **88** of the same diameter as the inside diameter of interconnector shaft **76**. The lower surface of receptacle floor **72** is concentrically attached to the uppermost end of interconnector shaft **76**. The outside diameter of receptacle floor **72** matches the concave inside diameter of receptacle wall **70**. The receptacle wall **70** is a half cylinder approximately 19 cm. (7.5 inches) in length and approximately 8 cm. (3.25 inches) in diameter of a size suitable in diameter to enable longitudinal passage past can piston **26** during the crushing process. During assembly the receptacle wall **70** is placed in an upright position relative to its length and its concave side is fitted to the outside circumference of receptacle floor **72** with its extreme lower edge matched with the lower edge of receptacle floor **72**, then permanently attached in this position, with the line formed across the front vertical edges **90** of receptacle wall **70** placed in a parallel position relative to the longitudinal line formed between points **92** on footbar **82**.

The plunger faceplate **68** is a flat disc approximately 8 cm. (3.25 inches) in diameter. The outside circumfer-

ence of plunger faceplate **68** is fitted into the concave side of receptable wall **70**, and the upper edge of plunger faceplate **68** is matched with the extreme upper edge of receptacle wall **70**, then permanently attached in this position. The base of a triangular crimping bar **94**, approximately 8 cm. (3 inches) in length and 0.8 cm. (5/16 inch) in height, is permanently fastened to the lower surface of plunger faceplate **68** in a centrally bisecting position, with one longitudinal edge facing downward in a position substantially at right angles to the crimping bar **30** on piston **26** and the line formed across the front vertical edges **90** of receptacle wall **70**.

In relation to the construction of the handlebar unit, a tubular handlebar **62**, approximately 30 cm. (12 inches) in length, horizontally bisects the upper side of plunger faceplate **68**. Handlebar **62** is horizontally recessed to a depth approximately ½ of its diameter, at a midway point relative to its length, said recess corresponding in length to the circumferential outline of receptacle wall **70**. The recess in handlebar **62** is fitted to the upper side of plunger faceplate **68** and adjacent areas of receptacle wall **70** with the front longitudinal edge of the recess corresponding to the line formed across front edges **90** of receptacle wall **70**, after which handlebar **62** is permanently attached to the top of the can receptacle unit. The two handlebar anti-slip grips **64**, which are tubular with an inside diameter approximately equivalent to the outside diameter of handlebar **62**, are then laterally installed as in FIG. **1**.

Assembly of the complete can crushing device to correspond with FIG. **1** is accomplished as follows: The top end of primary column shaft **24**, FIG. **2**, with assembled base unit **12** and assembled suppressor unit **16** in place, is inserted upwardly into the extreme bottom end of interconnector shaft **76**, FIG. **3**, passing through bushing **80**, and to a point flush with the top of bushing **78** and with slot **56** in alignment with hole **96**, shaft **24** thus becoming the inner shaft of the preferred embodiment. Spring **28** is inserted into the top end of hollow primary column shaft **24** in a downward direction until hook **44** is in alignment with hole **96**, after which setscrew **98** is installed into threaded hole **96** passing through slot **56** and securing hook **44**. A looped wire or other suitable tool is then used to secure hook **42** of spring **28** drawing it sufficiently upward to enable passage of hook **42** through loop **40** of can piston **26** after which tubular extension **32** of can piston **26** is inserted into primary column shaft **24** where it is secured by insertion of setscrew **34** through hole **36** and into threaded hole **38**, thereby completing the assembly of the can crushing device.

OPERATION OF THE PREFERRED EMBODIMENT

With reference to FIG. **1**, in operation handlebar **62** is gripped with both hands by the operator and the can crusher is placed in front of the operator in an upright position with the open end of the can receptacle chamber **74** facing away from the operator. The base of the can crusher is placed at a distance approximately 40 cm. (16 inches) in front of the operator's feet. The handlebar is held approximately 15 cm. (6 inches) from the operator's midriff. The operator then releases one of handlebar grips **64**, using the free hand to place a can **100** into can receptacle chamber **74** in a position as shown in FIG. **4A**. After again gripping handlebars **64** with both hands, the operator depresses the handlebars until crimping bar **94** attached to the plunger faceplate **68** is in contact with the top of the can as shown in FIG. **4B**. The operator then places one foot on the footbar **82** and, using force from the weight of the body and arm and leg muscles, pushes the plunger downward through stages FIG. **4C** and FIG. **4D**, thereby crushing the can.

After the can has been crushed the operator releases the downward pressure on the handlebar and footbar. Spring **28**, FIG. **2**, automatically returns the plunger **60**, FIG. **1**, upward to ready position. The operator then removes the crushed can from the can receptacle, replaces it with an uncrushed can and repeats the can crushing cycle.

A description of the specific function of each of the various components of the can crushing device is as follows: The primary column **10**, FIG. **2**, consisting of base **12**; a spring-loaded suppressor unit **16** comprised of stem **18**, spring **20** and disc **22**, and setscrew **50**; primary column shaft **24** and can piston **26** provides a means by which the can to be crushed is placed upon a stable and portable surface within easy reach of the operator.

The function of base **12** and attached base anti-slip pad **14**, which is constructed from rubber or other durable resilient material, is to distribute the downward thrust of the can crusher during operation, making it possible to operate the can crusher on a variety of surfaces including kitchen or garage floors, sidewalks, or roadsides without danger of slippage or damage to the supporting surface. The bottom convex shape of the base and pad permits the can crusher to be held at an angle toward the operator for maximum utilization of body weight and arm and leg muscle force, without sacrificing the downward force distribution and the antislip safety features of the base design.

The function of the spring-loaded suppressor unit **16**, comprised of suppressor stem **18**, suppressor spring **20**, and spring barrier disc **22**, is to permit the operator to build momentum before expending the maximum amount of force needed to collapse the can structure. Slot **54** in the suppressor stem permits reciprocal vertical motion of the stem within primary column shaft **24** past setscrew **50** which controls the upper and lower limits of reciprocal motion and also prevents rotation of the suppressor stem in relation to its position within the primary column shaft as shown in FIG. **1**. When the operator begins to exert downward force at stage FIG. **4B**, the compression spring absorbs the downward force until that point in time when the combined operator force and the force stored in the compressed spring overcomes the resistance offered by the can's structure. As the can begins to collapse, its resistance is reduced, enabling the stored force within the compressed spring to expand the spring to its original length, thereby accelerating the crushing process. This in turn accelerates the momentum generated by the continuing force expended by the operator through stage FIG. **4C**. As the crushing process begins to reach stage FIG. **4D**, the compacted can structure gradually offers increased resistance with the result that the suppressor spring is again compressed, enabling maximum utilization of the operator's momentum for the final crushing action and absorbing the abrupt reduction of downward movement at the final stage of the crushing process. The compressor spring returns to its normal length on cessation of downward force by the operator after the crushing process is completed.

The primary column shaft **24** serves as a rigid supporting connector between the combined base and suppressor units and the can piston **26**, elevating the can

piston to make it convenient for the operator to place uncrushed cans into the can receptacle chamber **74** and to remove cans after the crushing process. Slot **56**, FIG. **2**, provides passage for setscrew **98**, FIG. **3**, as the plunger travels down and up during the crushing process. The slot and setscrew also prevent rotation of primary column **10** in relation to its position within plunger **60** as shown in FIG. **1**.

The purpose of can piston **26** is to serve as a stationary shelf upon which the can is placed preparatory to the crushing process. The can piston serves to hold the can at a static elevation as the can receptacle unit moves down upon the can during the crushing process. The upper edge of crimping bar **30**, which bisects the top surface of can piston **26**, slightly forward of center, serves to initially tilt the can backwards into the can receptacle chamber **74**, then serves to hold the can in position by biting into opposite edges of the can's bottom circumference while it is being crushed and also serves to crimp the bottom of the can at these two points when the crushing process is in stages FIG. **4B** and FIG. **4C**. This crimping action causes the initial collapse of the can's lower structure and reduces the amount of energy needed to complete the can crushing process.

The plunger **60**, FIG. **3**, consisting of footbar **82**, interconnector shaft **76**, can receptacle unit **66** comprised of floor **72**, wall **70**, and plunger faceplate **68**, and handlebar **62**, serves as a unitized vertically reciprocative means through which downward force is applied to the top of can by the operator to effectuate the crushing process.

Footbar **82** at the lower end of interconnector shaft **76** is designed for use by either foot during the can crushing process. The function of the footbar is to provide a means for delivery of downward force from the operator's leg muscles and body weight to the interconnector shaft. The footbar anti-slip pads **86**, constructed of rubber of other resilient material and inserted into the recesses in the top surfaces of the footbar are for safety purposes to prevent the operator's foot from slipping from the footbar and to absorb resistive force generated during the can crushing process.

The function of interconnector shaft **76**, which slidably surrounds and encases shaft **24**, is to stabilize the vertical position of the plunger in relation to the primary column and to serve as a rigid link transmitting downward force applied to footbar **82** by the operator to the can receptacle unit. The bushings mounted at the top and bottom ends of said interconnector shaft reduce the surface area in contact with the inner shaft as the plunger reciprocates down and up during the crushing process, thereby allowing a maximum amount of the energy expended by the operator to be used for the crushing process. Setscrew **98** which installs into threaded hole **96** in the interconnector shaft serves to retain hook **44** of spring **28**. Setscrew **98** also passes through slot **56** of primary column shaft **24** preventing rotation of the primary column in relation to its position within the plunger as shown in FIG. **1**. As a safety measure setscrew **98** also acts as a stop against the lower end of slot **56**, preventing complete closure of the can receptacle chamber **74** if the device is inadvertently operated without a can in the can receptacle.

The can receptacle unit **66**, comprised of plunger faceplate **68**, receptacle wall **70**, and receptacle floor **72**, serves as a receiver to hold the can in an upright position before and during the crushing process. Receptacle floor **72** serves as the connecting means between interconnector shaft **76** and receptacle wall **70**, which in turn serves as the connecting means between receptacle floor **72** and receptacle plunger faceplate **68**. The lower edge of crimping bar **94**, which bisects the lower surface of the plunger faceplate **68**, serves to hold the can in position by biting into opposite edges of the can's top circumference as the plunger moves down upon the can during the crushing process and also serves to crimp the top of the can at these two points when the crushing process is in stages FIG. **4B** and FIG. **4C**. This crimping action causes the initial collapse of the can's upper structure and, in concert with crimping bar **30** on can piston **26**, reduces the amount of energy needed to complete the can crushing process.

The handlebar **62**, attached to the top surface of plunger faceplate **68**, serves as a means for the operator to carry the can crusher, to stabilize it during operation and as a point on which to transmit downward force from the operator's arm muscles and upper body to plunger faceplate **68**. The handlebar anti-slip grips **64**, constructed of rubber or other resilient material, are installed at both ends of the handlebar for safety purposes to prevent the operator's hands from slipping from the handlebars during the can crushing process, while carrying the can crusher, or when placing the can crusher in operational position.

The function of pull spring **28**, FIG. **2**, is to provide a means to hold the assembled can crusher in its fully extended position as in FIG. **1**, and as in FIG. **4A**, in order to facilitate placement of cans into can receptacle chamber **74**. A further function of the pull spring is to telescopically return the can crusher to its fully extended position after the plunger has been forced downward during the can crushing process, thereby completing the operational cycle.

ALTERNATIVE EMBODIMENT (FIGS. 5 THROUGH 7)

FIGS. **5** through **7** illustrate an alternate embodiment of the can crushing device which has structural variations from the preferred embodiment, FIG. **1**, but which has components and function identical to the preferred embodiment. In the alternative embodiment, interconnector shaft **76'** of FIG. **7** is the inner shaft in relation to primary column shaft **24'** of FIG. **6**, while in the preferred embodiment interconnector shaft **24** of FIG. **2** is the inner shaft in relation to interconnector shaft **76**, FIG. **3**. Primary column shaft **24'** of FIG. **6** is approximately 20 cm. (8 inches) longer, beginning at location **27**, than primary column shaft **24** of FIG. **2** of the preferred embodiment; this provides a means for attaching receptacle wall **70'** and faceplate **68'** in a front offset position to the front edge of primary column shaft **24'** upwardly beginning at location **27** of FIG. **6**, to serve as a can receiver. Faceplate **68'** and its crimping bar **94** (FIGS. **5** and **6**) of the alternate embodiment have the same function as faceplate **68'** and crimping bar **94** (FIG. **3**), except that faceplate **68'** of the alternate embodiment is mounted at the bottom edge of receptacle wall **70**, with its crimping bar **94** facing upward, instead of at the top edge of receptacle wall **70'**, with its crimping bar **94** facing downward, as in FIG. **3** of the preferred embodiment.

Receptacle wall **70'** of FIG. **6** in the alternate embodiment remains stationary during the crushing process instead of traveling down and up as part of the plunger in the preferred embodiment. Can piston **26'** and its

crimping bar **30**, FIGS. **5** and **7**, have the same function as can piston **26'**, and its crimping bar **30**, (FIG. **2**), except that the can piston is offset from interconnector shaft **76'** with crimping bar **30** facing downward as in FIG. **7** instead of concentrically attached to primary column shaft **24'** with crimping bar **30** facing upward as in FIG. **2** of the preferred embodiment. Can piston **26'** of the alternate embodiment reciprocally travels down and up within stationary receptacle wall **70'**, held in suitable offset position by extension arm **69** (FIG. **5**), instead of traveling up and down as in the preferred embodiment. Suppressor spring **20'** (FIG. **6**) of the alternate embodiment is mounted externally instead of internally as in FIG. **2** of the preferred embodiment. Return spring **28**, FIG. **7** of the alternate embodiment mounts within interconnector shaft **76'** instead of within primary column shaft **24** (FIG. **2**) of the preferred embodiment. As is readily apparent to any person skilled in the art to which this invention pertains, the remaining components, base **12**, footbar **82** and handlebar **62** of the preferred and alternate embodiments, have the same construction and function and it is also apparent that the preferred embodiment and the alternative embodiment have the same function and equal capability to meet the basic object of crushing and compacting cans.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of one preferred embodiment thereof. Variations within the scope of this invention include but are not limited by these additional ramifications: A horizontal indentation along one external side of tubular extension **32** (FIG. **2**) with a matching internal protrusion from primary column shaft **24** would meet the function of setscrew **34**, countersunk hole **36** and threaded hole **38** to prevent rotation of can piston **26** within shaft **24**. Crimping bars **30** of FIG. **2** and **94** of FIG. **3**, and crimping bars **94** of FIG. **6** and **30** of FIG. **7** will function regardless of the angle of one to the other but will function at optimum efficiency when positioned at right angles. The round tubular construction of the shafts of the preferred and alternate embodiments can be changed to square tube construction; this would eliminate the need for setscrews and slots to prevent rotation. The tubular and semi-tubular construction of the shafts, can container unit, handlebars and footbars of the preferred and alternate-embodiments may alternatively be made of a plurality of rods or tubes, cables or meshes or of a combination of singular shafts, plural rods, cables or tubes and meshes and flat stock. The portability of the preferred and alternate embodiments may be enhanced if base **11** is suitably enlarged to flexibly support the device in an upright position without fastening, or it may be attached to a floor or other horizontal surface or brackets may be used to flexibly attach the device to a wall or other vertical object for stationary mounting of the can crusher. Return spring **28**, FIG. **2** and FIG. **7**, may be mounted internally or externally of the device without impairing its function. Accordingly, the scope of the invention should be determined not by the embodiments illustrated, but by the appended claims and their legal equivalents.

What is claimed is:

1. A disposable container crushing device comprising:

a receiver shaped to hold a collapsible, disposable container, said receiver having a sidewall and an endwall extending at a substantially right angle from one end of said sidewall, said sidewall having a substantially circular curvature about an axis perpendicular to said endwall,

a piston at the other end of said sidewall, said piston having a surface substantially parallel to said endwall and movable within said receiver from said other end of said sidewall to said one end thereof,

a first elongated operating shaft attached to and extending from said receiver in an operating direction substantially parallel to said sidewall and the direction of travel of said piston,

a second elongated operating shaft attached to and extending from said piston in said operating direction, and operating means for manually moving one of said operating shafts in said operating direction with respect to the other of said shafts,

one of said operating shafts being tubular, said shafts both extending in the same direction from said receiver and said piston, the other of said operating shafts being an inner shaft telescoped within said tubular shaft,

one of said shafts extending farther from said receiver than said other such that a portion of said one distal from said receiver extends beyond the end of said end of said other which is distal from said receiver,

said operating means comprising (a) a pair of foot pedals extending perpendicularly out from said other of said shafts at the end thereof distal from said receiver in respectively opposite directions, and (b) a pair of handholds extending perpendicularly out from the portion of said device adjacent said receiver in respectively opposite directions corresponding to the respective directions in which said foot pedals extend, the distance between said foot pedals and said handholds being sufficiently great that a human can operate said device with his or her foot on one of said foot pedals while holding said handholds with his or her hands.

2. The device of claim **1** wherein said handholds are attached to said receiver and extend therefrom such that said receiver effectively can be grasped manually and said operating shaft can be foot-operated while said inner operating shaft is positioned against said floor, whereby manual and foot pressure can be combined to operate said device.

3. The device of claim **1** wherein said handholds are attached to said piston and extend therefrom such that said piston effectively can be held manually and said inner operating shaft can be foot operated while said tubular operating shaft is positioned against said floor, whereby manual and foot pressure can be combined to operate said device.

4. The device of claim **3** wherein said handholds are attached to said piston by an arm which extends through a slot in said sidewall of said receiver.

5. The device of claim **1** further including resilient means for returning said piston to said other end of said sidewall from said one end of said sidewall if said piston is moved to said one end of said sidewall.

6. The device of claim **1** further including resilient means for assisting the movement of said piston when it is moved from said other end of said sidewall to said one end of said sidewall.

7. The device of claim **6** further including resilient means for dissipating the velocity of said piston movement when said piston approaches said one end of said sidewall.

8. The device of claim 1 wherein said foot pedals are attached to said tubular one of said shafts, said inner and other of said operating shafts extending beyond said distal end of said tubular one of said shafts.

9. The device of claim 1 wherein said foot pedals are attached to said inner and other of said operating shafts, said tubular one of said shafts extending beyond said distal end of said inner shaft.

10. The device of claim 9 wherein said foot pedals are attached to said inner operating shaft via a slot in said tubular operating shaft.

11. The device of claim 1 wherein the surface of said piston and the facing surface of said endwall both contain an elongated raised portion, said elongated raised portions being orthogonally oriented, thereby to provide crimping bars.

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